



WOERFAR

天津沃尔法 电力设备有限公司

TIANJIN WOERFAR ELECTRIC EQUIPMENT CO.,LTD.

Products

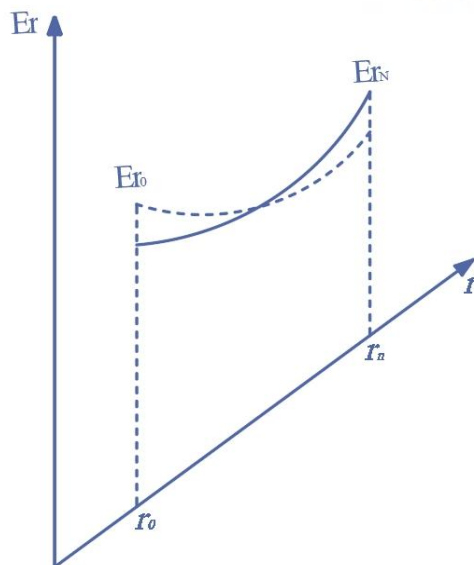
GGM Power station tubular busbar

FDLGM Wind power tubular busbar

WDF Cable distribution box

SRGE/SRG fiberglass sleeving

$$E_r = \frac{U}{2} \cdot \frac{l_0 + l_n}{\ln \frac{r_n}{r_0}} \cdot \frac{1}{rl}$$





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法

Profile

Tianjin Woerfar Electric Equipment Co., Ltd. was founded in 2012 as a wholly-owned subsidiary of Shenzhen Woer Heat-Shrinkable Material Co., Ltd. (002130.SZ, 09981.HK). It is located at No.183 Xiangyuan Road, Jingjin Technology Valley, Wuqing District, Tianjin.

As a national-level high-tech enterprise, a Specialized, Refined, Differential and Innovative Small-medium-sized Enterprise, and a participant in drafting national standards, the company boasts strong technical capabilities with more than one hundred national patents, and has obtained ISO9001, ISO14001 and ISO45001 system certifications. Its main products consist of power station tubular busbars, wind-power tubular busbars, cable distribution boxes and flexible fiberglass insulation sleeves.

The company's products have obtained authoritative domestic and international test reports and certifications issued by the Electric Power Equipment Quality Inspection & Test Center of China Electric Power Research Institute, National Quality Supervision and Test Center for Electric Wires and Cables, Xi'an High-Voltage Apparatus Research Institute Co., Ltd., China Quality Certification Center (CQC), National Quality Supervision and Test Center for Electric Control & Distribution Equipment, and UL of the United States. The products have been operating safely on a large scale in power systems and are well-received by customers.

Adhering to the business philosophy of "customer-oriented, high quality, low cost and excellent service", Tianjin Woerfar Electric Equipment Co., Ltd. is committed to providing high-quality products and efficient services for all customers.

Area: **60000** m²

Patent: **80+**

Registered Capital: **61million**



Culture

Enterprise Vision



To be the leader in new material industry, Provide security and intelligent connectivity with leading technology .
To provide customers with safe, environmentally friendly, maintenance-free transmission solutions.

Core Value



Hard work
Pragmatic and efficient
Win-win cooperation

Enterprise Mission



Enterprise success
Staff happiness
Repaying the society

Business Concept



Customer orientation
High quality
Low cost
Good service



Partners



Honor



Certifications

此证书 CN14/31610.01 译本

天津沃尔法电力设备有限公司

统一社会信用代码: 911202226029192505
注册地址: 中国天津市武清区自行车王国产业园区福远路西侧
经营地址: 中国天津市武清区自行车王国产业园区福远路西侧

依据主证书 CN14/31610.00 中规定的管理体系已经过审核, 并被证明符合下述要求
ISO 9001:2015

所涉及的活动范围是
绝缘管型母线和电缆分支箱的设计、制造和销售
玻璃纤维套管和集电环的设计、制造和销售

该证书的有效期自 2024 年 03 月 26 日 至 2026 年 01 月 27 日 并须经符合要求的监督审核保持有效
版本 3.0
此证书的有效性取决于主证书的有效性。

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公司

审核, 并被证明符合下述要求

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COMPLIANCE

18-0
i24

FAR ELECTRIC EQUIPMENT CO., LTD.
Fuyuan Road, Kingdom Of Bicycles Industry
District, Tianjin, China
Shi 301700

g. Flame Retardant - Component
Page for Product Designation(s).

uated by UL in accordance with the
irements in the Standard(s) indicated on
UL Recognized components are incomplete
utional features or restricted in
abilities and are intended for installation in
ment submitted for investigation to UL LLC.

I., Issue Date: 2021-06-21, Revision Date:

ne Certifications Directory at
ector.com for additional information

e samples of the product described in the certification
es not provide authorization to apply the UL
e that references the Follow-Up Services Procedure
e UL Mark.

nt Mark should be considered as being UL Certified

luct.

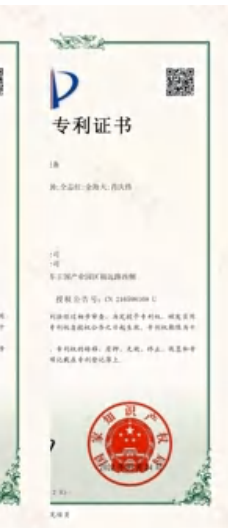
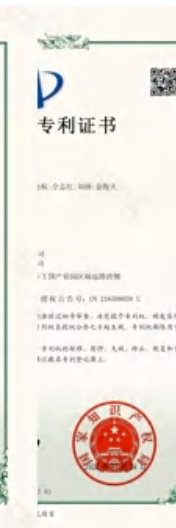
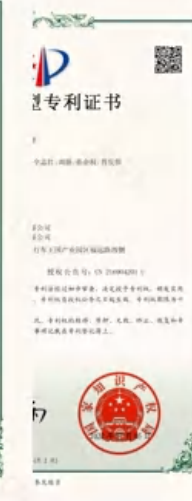
UL

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Test reports

Patents



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Power Station Busbar

■ Craft and Structure

Insulated tubular bus body shall include: Tubular conductor, Conductor shield, Insulating layer (Multiple layers can be set), Insulating shielding layer (Multiple layers can be set), Metal shielding layer and cover layer. According to the molding process and insulation method, the insulated tubular busbar is divided into the following three types:

■ Capacitive bushing type structure

Using mechanical wrapping molding process, Multi layer insulating shielding layer is used to homogenize the electric field at the end of the bus bar and insulate the middle part.

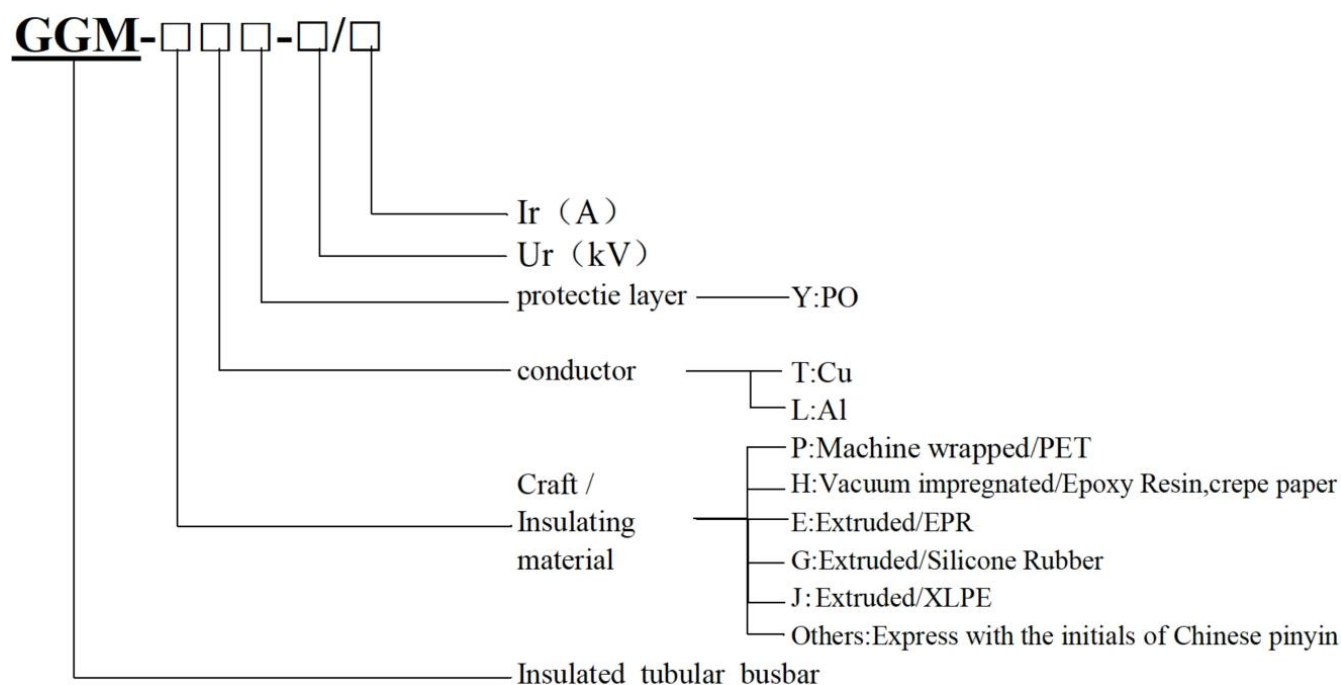
■ Power cable type structure

Using extrusion molding process, The stress cone is used to homogenize the electric field at the end of the bus bar. The middle part is insulated with a single insulating shield.

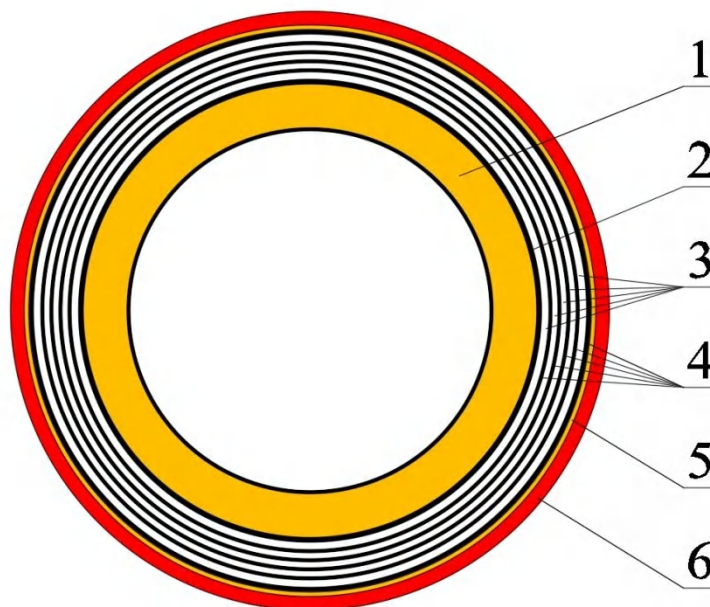
■ Capacitive bushing type & Power cable type hybrid structure

Using vacuum impregnation (epoxy casting) molding process, Multi layer insulating shielding layer is used to homogenize the electric field at the end of the bus bar. The middle part is insulated with a single insulating shield.

■ Demonstration of the type

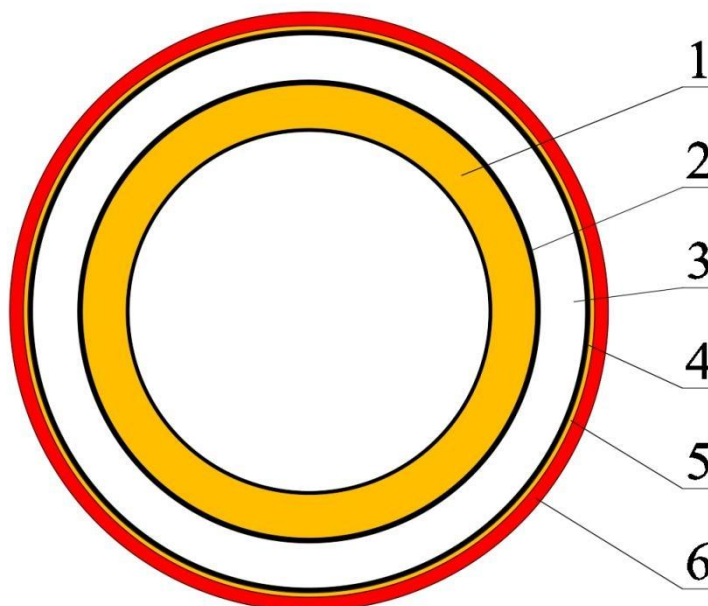


■ Cross-section Schematic



1-Tubular conductor;2-Conductor shield;3-Insulation layers;
4-insulation shielding layers;5-Metal shielding layer;6-Protective layer

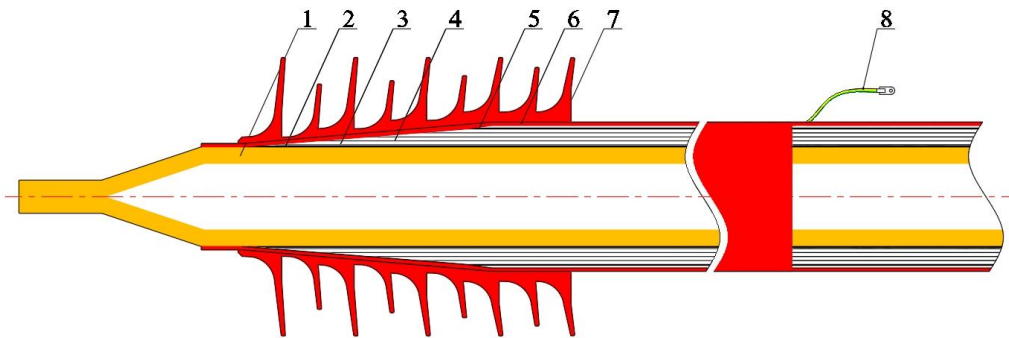
Capacitor-bushing-type Insulated Tubular Busbar



1-Tubular conductor;2-Conductor shield;3-Insulation layer;
4-insulation shielding layer;5-Metal shielding layer;6-Protective layer

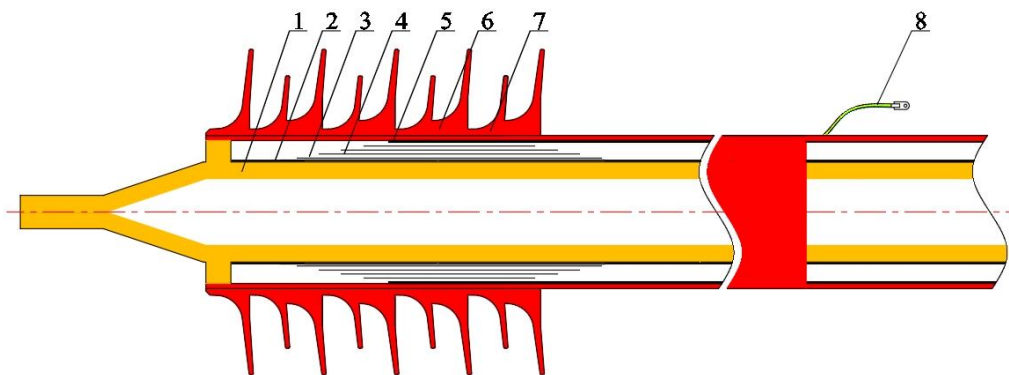
Power- cable- type Insulated Tubular Busbar

■ Body & Termination



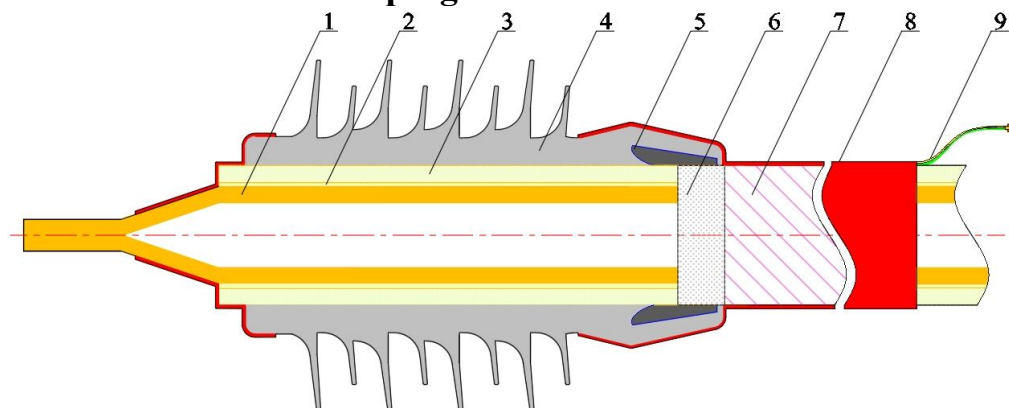
- 1-Tubular conductor;2-Conductor shield;3-Insulation layers;
4-insulation shielding layers;5-Metal shielding layer;6-Protective layer;7-Shed;8-PE

Mechanical Lapped and Wrapped Insulated Busbar



- 1-Tubular conductor;2-Conductor shield;3-Insulation layers;
4-Insulation shielding layers;5-Metal shielding layer;6-Protective layer;7-Shed;8-PE

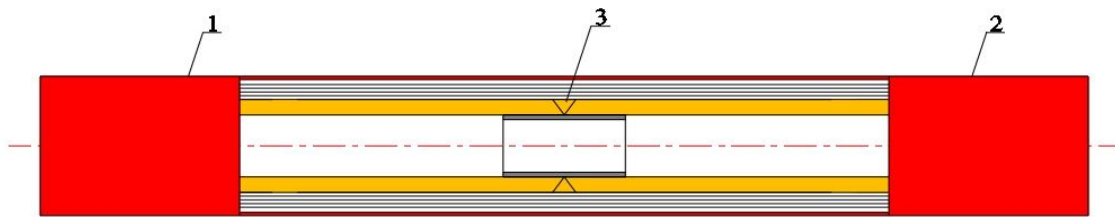
Vacuum Impregnated Insulated Busbar



- 1-Tubular conductor;2-Conductor shield;3-Insulation layers;4-Insulated terminal
5-Stress Cone;6-Insulation shielding layer;7-Metal shielding layer;8-Protective layer;9-PE

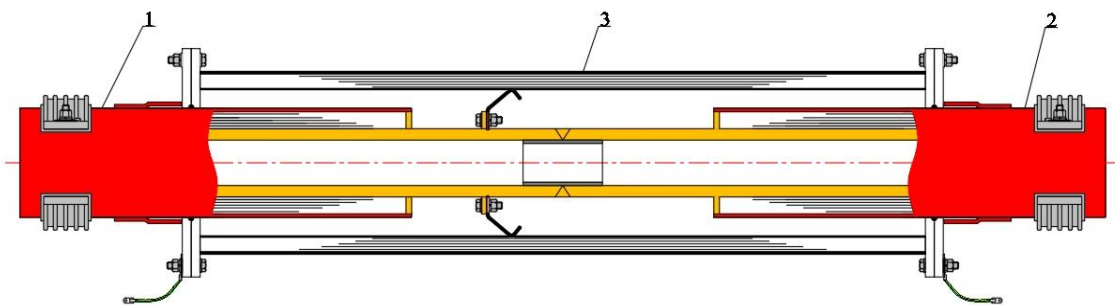
Extruded Insulated Busbar

■ Busbar Body Joint



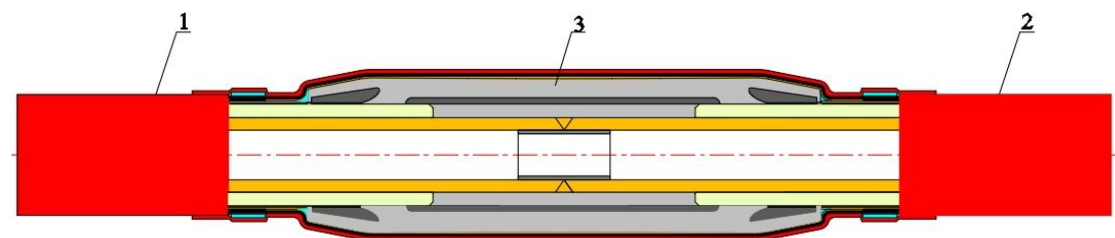
1-Body1;2-Body2;3-joint

Mechanical Lapped and Wrapped Insulated Busbar



1-Body1;2-Body2;3-joint

Vacuum Impregnated Insulated Busbar



1-Body1;2-Body2;3-joint

Extruded Insulated Busbar

■ Products of 1kV and Below

The product is applied for electric energy transmission and distribution in low-voltage power supply systems. It can be used in 10 kV substations as a substitute for cables, bus ducts and other equipment rated at 1 kV and below. Available in three-phase four-wire and three-phase five-wire configurations, the product supports either multi-layer or single-layer arrangement. It features high current-carrying capacity, high protection degree, convenient power distribution, safety and reliability, as well as clear and simple wiring, and is suitable for installation in various complex environments and spaces. Compared with bus ducts and cables, it offers advantages of larger transmission capacity, lower line loss, and lower risk of phase-to-phase or phase-to-ground short-circuits. It is especially suitable for high-current low-voltage power distribution systems in industrial and mining enterprises, as well as power supply systems for commercial-residential buildings, hotels and hospitals.

■ Operating Condition

- ◆ Altitude: $\leq 4000\text{m}$, Above 4000m requires special design
- ◆ Ambient Temperature: $-50^{\circ}\text{C} \sim 70^{\circ}\text{C}$
- ◆ Relative Humidity: Daily $\leq 95\%$, monthly $\leq 90\%$ (25°C)
- ◆ Seismic Intensity: ≤ 8
- ◆ Installation Category: III
- ◆ Pollution Level: IV
- ◆ Special Requirements: Please consultation with the manufacturer

■ Specifications

- ◆ Rated Voltage: $\leq 1\text{kV}$
- ◆ Rated Current: 630A ~ 12500A
- ◆ Rated Short-time Withstand Current: 12.5kA / 25kA / 40kA / 63kA / 80kA / 100kA
- ◆ Rated peak Withstand Current: 31.5kA / 52.5kA / 84kA / 126kA / 168kA / 200kA
- ◆ Material Group: IIIa
- ◆ Over-voltage Category: III
- ◆ Power-frequency Withstand Voltage: 3.5kV (5s)
- ◆ Maximum Temperature Rise: 60K

■ Products of 3.6kV~40.5kV

The product is used for connections between wiring terminals of various electrical equipment. Each phase is independently insulated and sealed, with full-length insulation shielding, free from environmental interference and featuring high reliability. The conductor is of tubular design, delivering a low skin-effect coefficient, high current-carrying capacity, superior mechanical strength and strong short-circuit current withstand capability, and allows large installation span. It can be directly mounted on metal frameworks, eliminating the need for wall-bushing insulators and post insulators, and exhibits excellent seismic performance. It is easy to install and maintenance-free.

■ Service Conditions

- ◆ Altitude: ≤1000m, Above 1000m requires special design
- ◆ Ambient Temperature: -50°C~70°C
- ◆ Relative Humidity: Daily ≤95%, monthly ≤90%(25°C)
- ◆ Seismic Intensity: ≤8
- ◆ Pollution Level: IV
- ◆ Special Requirements: Please consultation with the manufacturer

■ Insulation Performance

Insulation Level of 3.6 kV ~ 40.5 kV Insulated Tubular Busbar

Ue kV	Um kV	Power-freq. Withstand Volt. kV	Lightning-impulse Withstand Volt. kV	Partial Discharge Level		Dielectric Loss tanδ
				Test Volt. kV	PD Magnitude pC	
3	3.6	25	40	3	≤5	Measuring volt.: 10kV tanδ≤0.005 (-10 ~40°C)
6	7.2	32	60	6	≤5	
10	12	42	75	15	≤5	
20	24	65	125	24	≤5	
35	40.5	95	200	40.5	≤5	

■ Current Characteristics

- ◆ Rated Current: 630A~12500A
- ◆ Short-time Withstand Current(4s): 16kA~200kA
- ◆ Peak Withstand Current: 2.5 times the rated short-time withstand current
- ◆ Maximum Temperature Rise: 60K

■ Products of 72.5kV and above

It is used for connections between transformer neutral points and arc-suppression coils; for bay busbars and incoming/outgoing busbars of SF₆ gas-insulated switchgear (GIS); for substituting overhead lines in extra-high-voltage SF₆ hybrid gas-insulated switchgear (HGIS); and for long-distance transmission lines with high voltage and large current. It serves as an optimal alternative to high-voltage insulated cables, GIS branch busbars and incoming/outgoing feeders, as well as gas-insulated metal-enclosed transmission lines (GIL). The product features environmental friendliness, high safety and reliability, space-saving footprint and convenient maintenance.

■ Service Conditions

- ◆ Altitude: ≤1000m, Above 1000m requires special design
- ◆ Ambient Temperature: -50°C~70°C
- ◆ Relative Humidity: Daily ≤95%, monthly ≤90%(25°C)
- ◆ Seismic Intensity: ≤8
- ◆ Pollution Level: IV
- ◆ Special Requirements: Please consultation with the manufacturer

■ Insulation Performance

Insulation Level of 72.5 kV ~ 252kV Insulated Tubular Busbar

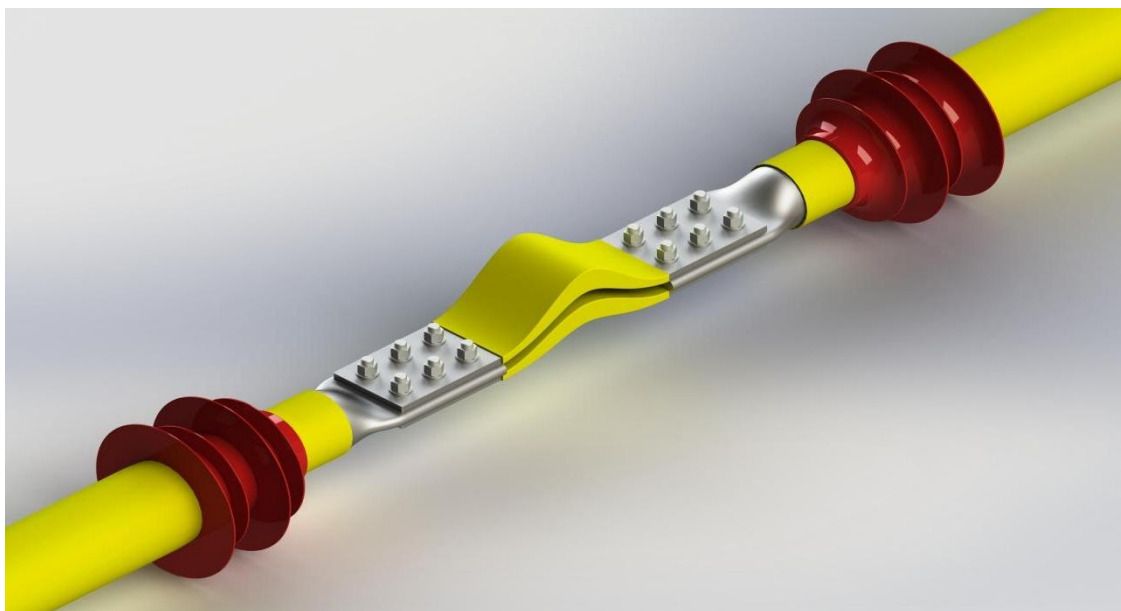
Um kV	Power-freq. Withstand Volt. kV	Lightning-impulse Withstand Volt. kV	Partial Discharge Level			Dielectric Loss tanδ
			Pre-app. Volt.(kV)	Test Volt. kV	Partial Discharge Magnitude pC	
72.5	155	325	155	87	≤5	Measuring volt.: 10kV tanδ≤0.005 (-10 ~40°C)
126	230	550	230	151	≤5	
252	460	1050	395	302	≤5	

■ Current Characteristics

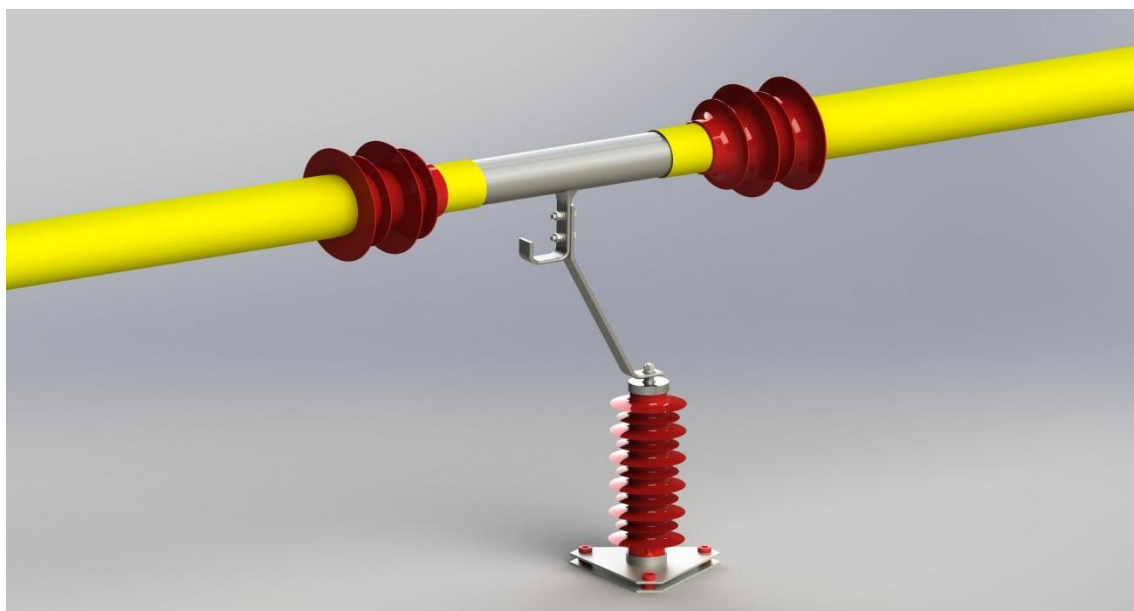
- ◆ Rated Current: 630A~12500A
- ◆ Short-time Withstand Current: 16 kA ~ 200 kA; 4s for 72.5 kV & 126 kV, 2s for 252 kV
- ◆ Peak Withstand Current: 2.5 times the rated short-time withstand current
- ◆ Maximum Temperature Rise: 60K

Typical Installation Structure

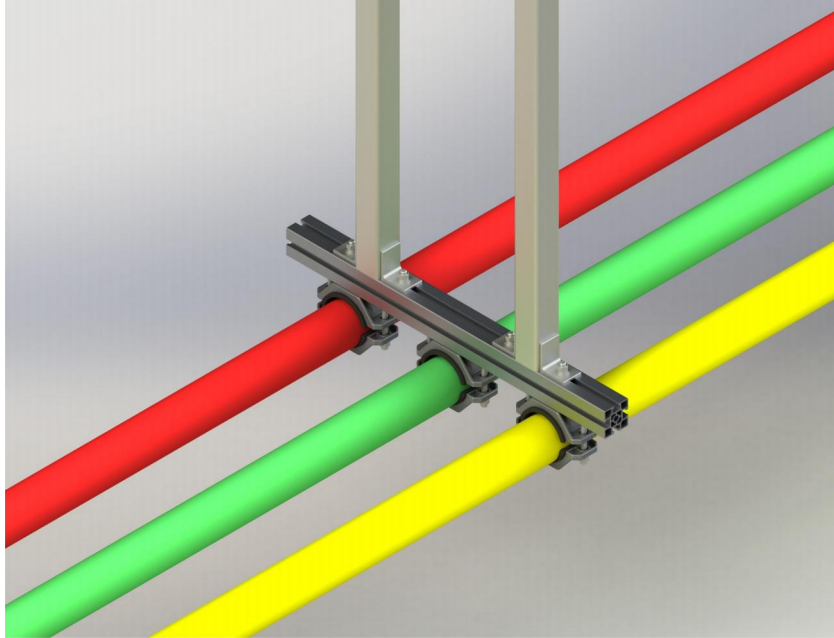
■ Middle Expansion Joint



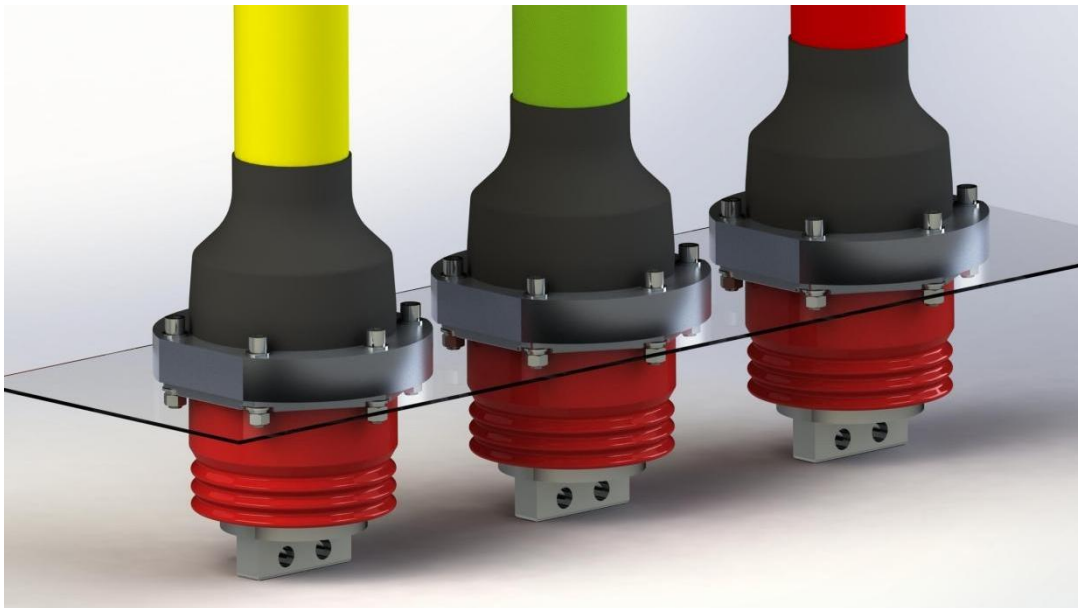
■ Arrester Connection



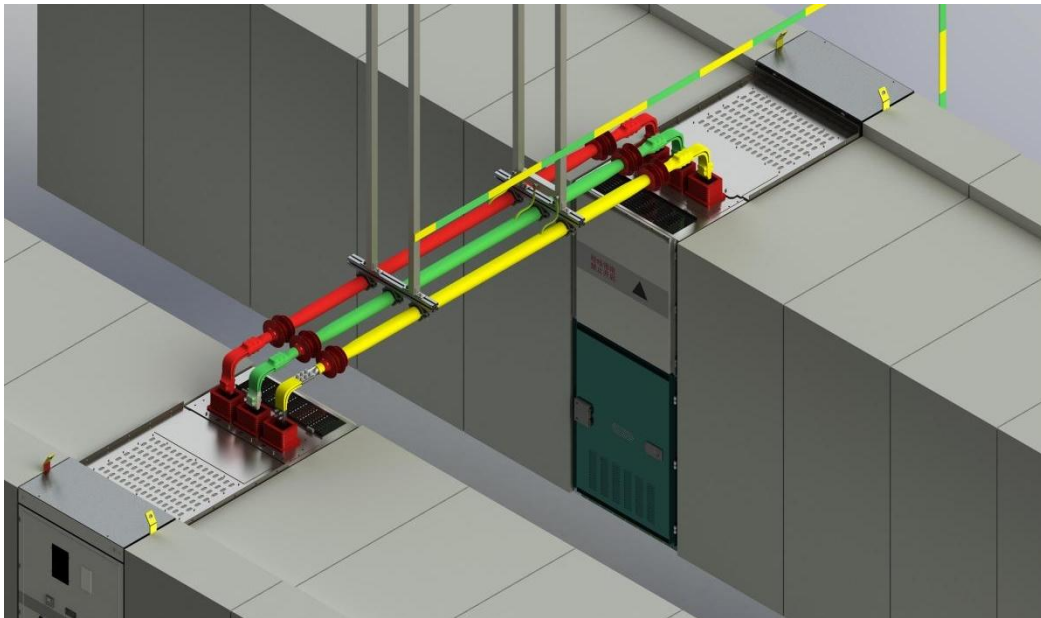
■ Hanger Fixation of Busbar



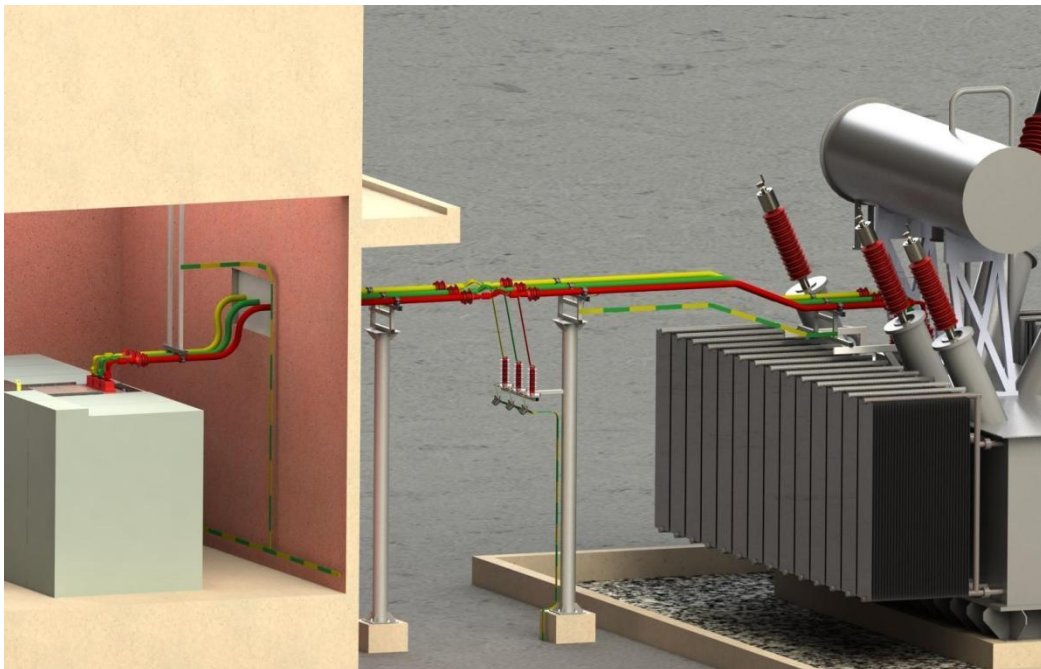
■ Connection with Inner-cone Socket



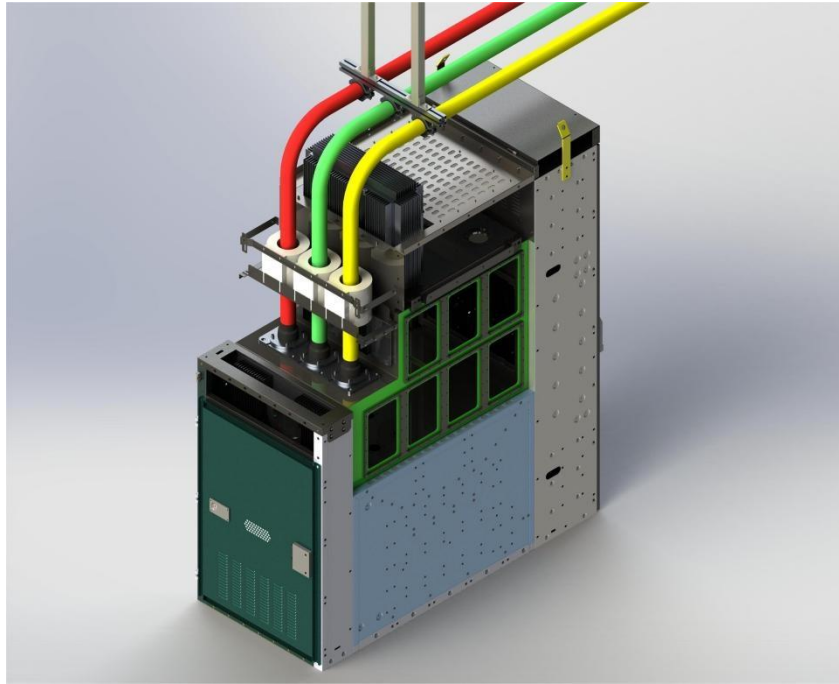
■ Connection with Open-type Switchgear



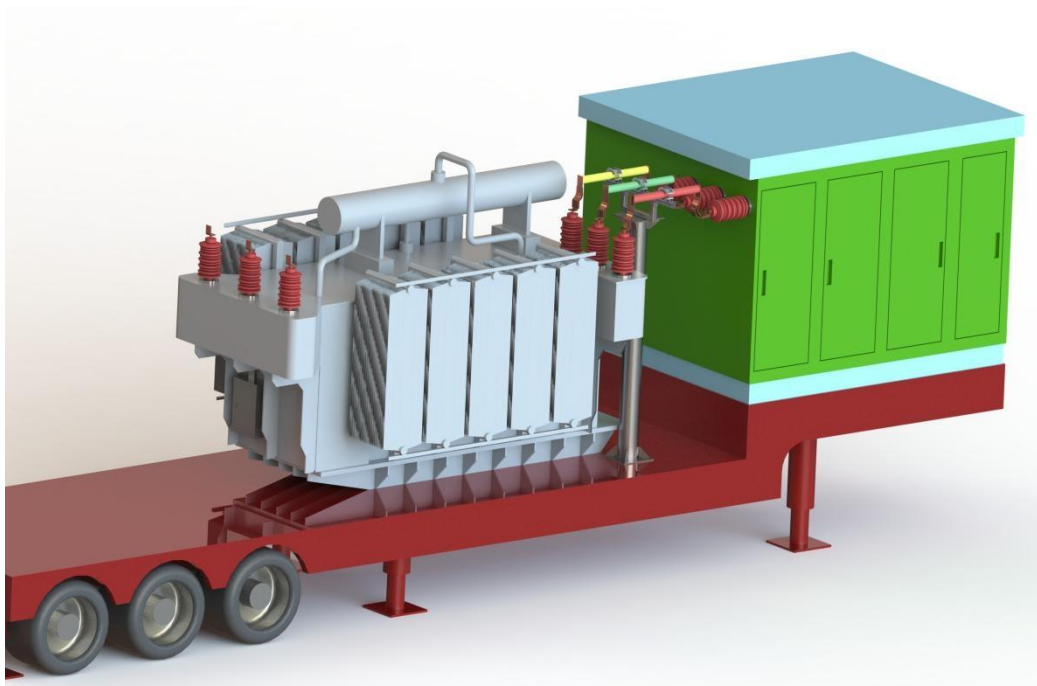
■ Connection with Transformer



■ Connection with Gas-insulated Switchgear



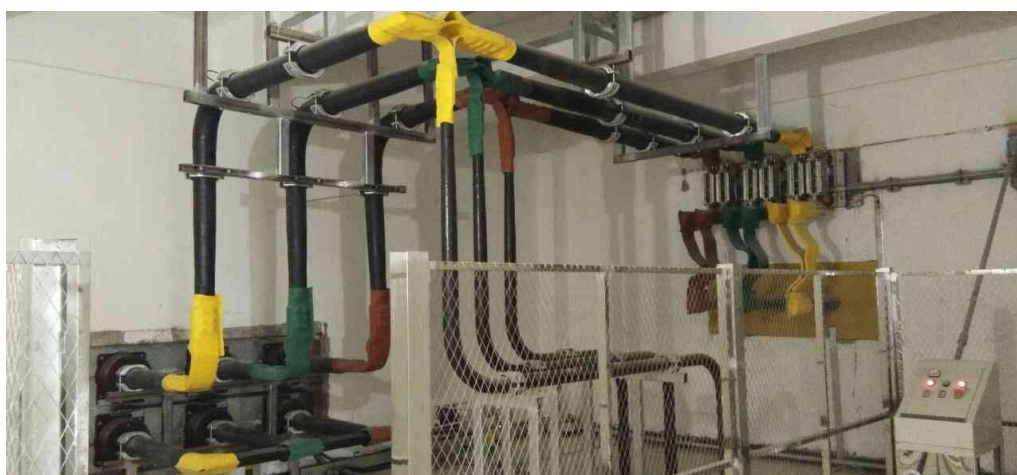
■ Connection with On-board Transformer



Application Cases



12kV/3150A Hydropower Generation



12kV/8000A Thermal Power Generation



12kV/4000A Waste-heat Power Generation



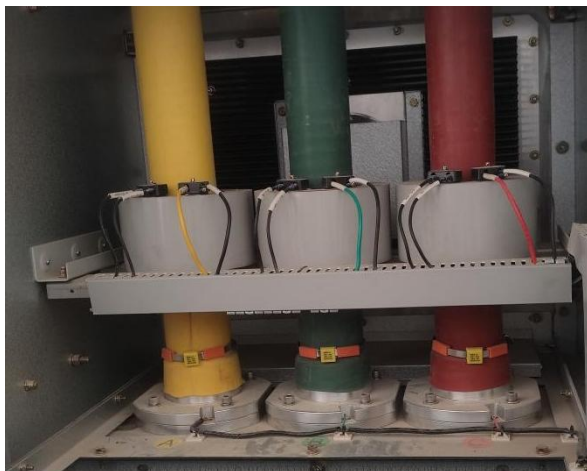
12kV/5000A Biomass Power Generation



40.5 kV/ 5000A Wind Power Generation



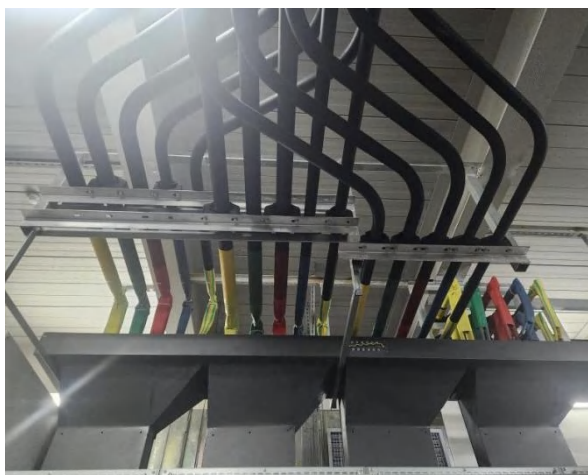
40.5kV/6300A Photovoltaic Power Generation



40.5kV/3150A Connection with SF₆ Gas-filled Switchgear



12 kV/ 5000A Paper Mill



0.4 kV/ 1600A Workshop Equipment



72.5kV/1600A State Grid Substation



12kV/6300A Peak-shaving & Energy Storage



12kV/4000A Petrochemical

Wind Power Tubular Busbar

■ Product Description

◆ Application Scenario: Applied inside the tower, it undertakes power transmission from the generator outlet to the converter cabinet. Aluminum alloy round tubes are adopted as conductors, and polyolefin heat-shrinkable tubes serve as the insulation layer. The support structure secures the busbar and bears its weight; the lateral restraint structure limits the busbar in the horizontal direction, and guides and accommodates thermal expansion and contraction in the vertical direction; the connection structure splices busbars between tower sections; the transition structure realizes conversion connection between the busbar and incoming/outgoing cables.

◆ Features: Distributed layout to prevent phase-to-phase short-circuit; 6-series aluminum alloy with high strength, creep resistance and anti-settling performance; single-conductor current-carrying without unbalanced load; integrated insulation and flame-retardant layers with favorable heat dissipation performance.

◆ Structure: The support structure is arranged at the upper part of each tower section. Several lateral restraint structures are installed below each support. The connection structure between tower sections is a flexible joint. The flexible joint connects the upper and lower busbar sections by bolting. Thermal expansion and contraction are absorbed at the flexible joint.

◆ Applicable Wind Turbine Types: Direct-drive, Semi-direct-drive, Doubly-fed, Squirrel-cage

◆ Applicable Tower Types: Steel tower, Hybrid tower

■ Service Conditions

◆ Natural Environment: Grassland, mountain, gobi, desert, ocean, etc.

◆ Altitude: Complete insulation and sealing, suitable for any altitude

◆ Seismic Intensity: ≤ 8 degree

◆ Ambient Temperature: $-50^{\circ}\text{C}\sim 70^{\circ}\text{C}$

◆ Relative Humidity: Max. daily relative humidity 95%, max. monthly relative humidity 90% (at 25°C)

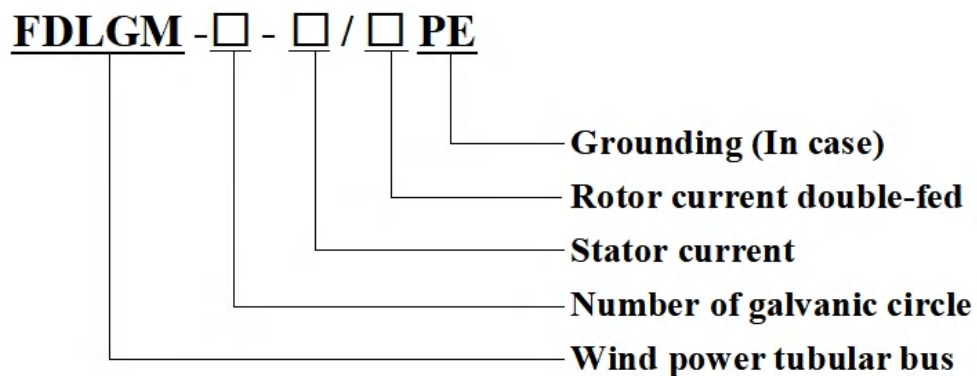
◆ Installation Category: Class III

◆ Pollution Degree: Class IV

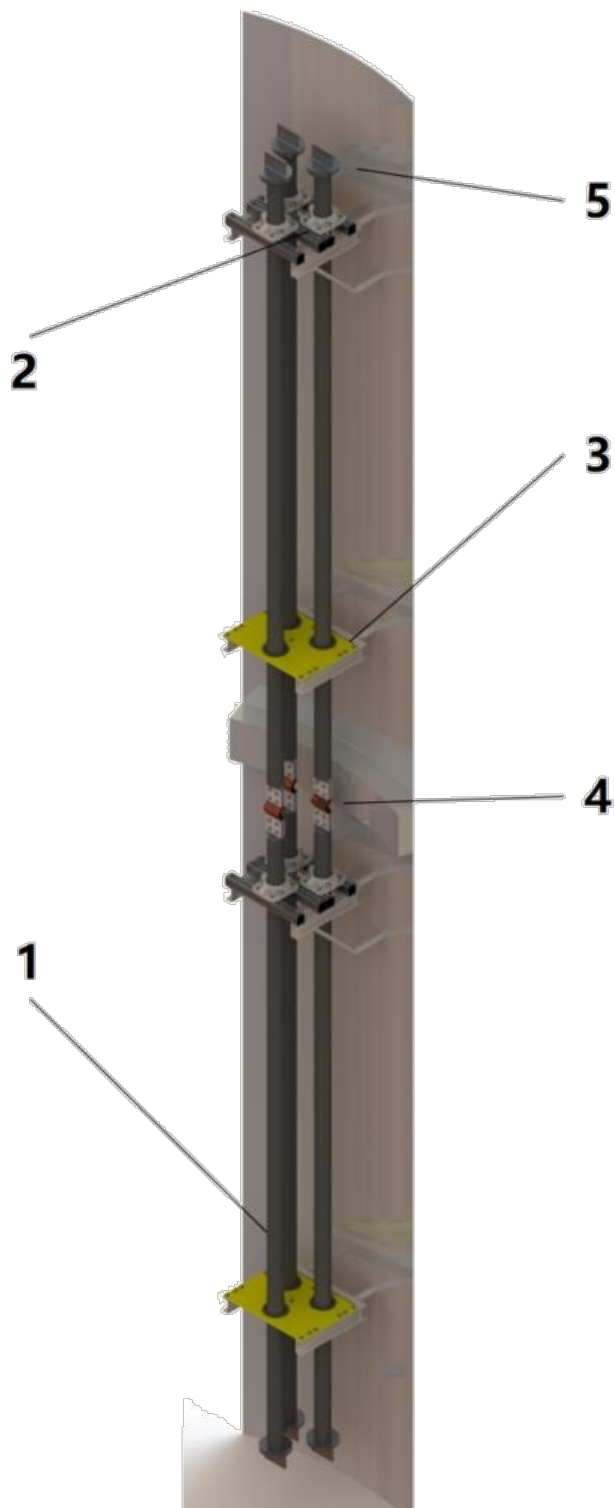
Parameters

Materials & Product Performance			
Conductor Grade	6101B-T6	Rated Voltage	≤3.0kV
Conductivity	≥55% IACS	Rated Current	≤6000A
Resistivity	31nΩ*m	Power- freq. Withstand Volt.	15kV,5min
Material Group	IIIa	Impulse Withstand Volt.	±45kV
Protection Class against Electric Shock	I	Short-time Withstand Current	85kA,1s
Over- voltage Category	IV	Peak Withstand Current	187kA
Coating of Contact Surface	Cu+Ni	Anti-collision Level	>IK10,50J
Pollution Degree	3	Ingress Protection	IP65
Salt- spray Resistance	720h	Seismic Intensity	8

Model Description



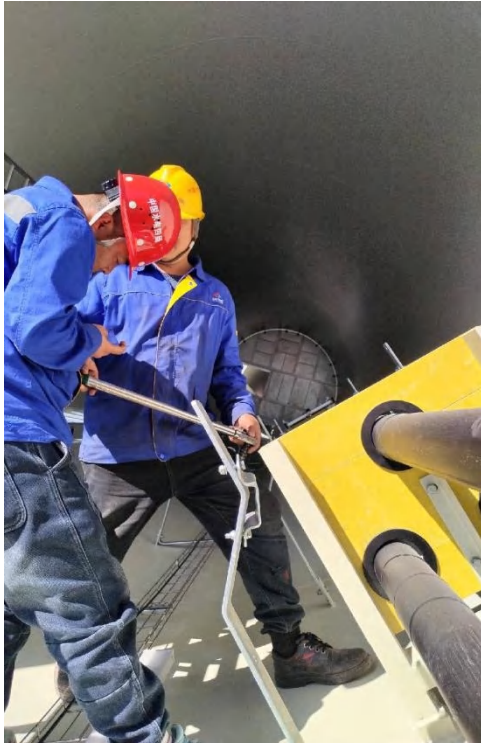
■ Structure



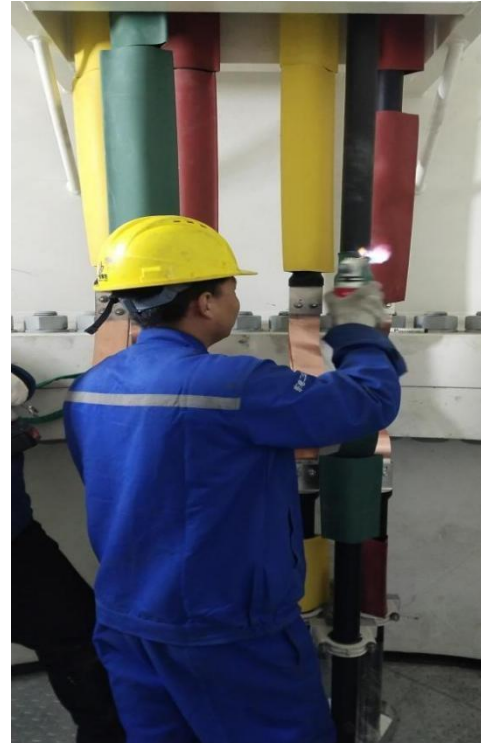
1-Body;2-Support Structure;3-Restraint Structure;4-Connection Structure;5-Transition Structure

Wind Power Tubular Busbar

■ Installation



Tower- factory Installation



Wind- farm Installation

■ Application



Steel Tower



Hybrid Tower

Cable Branch Box

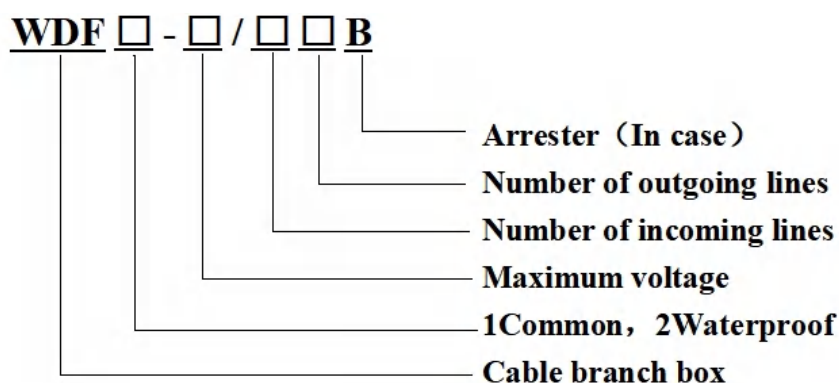
Product Description

Cable distribution boxes are widely used at cable tapping points of power distribution networks in recent years for electric power distribution. As supporting equipment for urban power-grid renovation, photovoltaic power generation, wind power generation and other projects, they can be installed both indoors and outdoors. They connect power cables with box-type transformers, load switch cabinets, load-switch-fuse combination electrical cabinets, ring-main units and other facilities to realize tapping, branching or conversion functions, which greatly facilitates cable network deployment. Its main feature is double-sided door opening. Wall-through bushings are adopted for connecting busbars, featuring simple and convenient connection. Advantages include compact overall length, neat cable arrangement, and no large-span crossing for three-core cables. With full-insulation, full-enclosure, corrosion-resistance, maintenance-free properties, the equipment is safe, reliable and highly adaptable to various environments.

Service Conditions

- ◆ Altitude: $\leq 2000\text{m}$, Above 2000m requires special design
- ◆ Ambient Temperature: $-35^{\circ}\text{C} \sim 50^{\circ}\text{C}$
- ◆ Relative Humidity: Daily $\leq 95\%$, monthly $\leq 90\%$ (25°C)
- ◆ Seismic Intensity: ≤ 8
- ◆ Pollution Level: III
- ◆ Special Requirements: Please consultation with the manufacturer

Model Description



Parameters

Um kV	Ie A	Power-freq. Withstand Volt. kV	Impulse Withstand Volt. kV	Short-time Withstand Current kA	Peak Withstand Current kA	IP Code
12	≤ 1250	42	75	20	50	IP54
40.5	≤ 1250	95	185	20	50	IP54

■ Product Pictures



12kV cable branch box



40.5kV cable branch box

Flexible fiberglass sleeving

Product Description

Flexible Fiberglass Insulating Sleeve is woven into a tubular form from high-heat-resistant alkali-free fiberglass, then coated on the outer layer with specially-formulated silicone rubber and cured by heating. Besides excellent dielectric properties, high heat resistance, good self-extinguishing performance and flexibility, it also features slight inner-diameter expandability. It is well-suited for automotive wire harnesses, H&C-class motors, generators, inductors, inverters, reactors, heating-lighting equipment and other mechanical devices, providing temp-resistance, protection and insulation functions.



Advantage

- ◆ Excellent temperature resistance, can be used for a long time at -50°C~200°C;
- ◆ Breakdown voltage is significantly higher than the corresponding voltage level;
- ◆ Excellent flame retardant, can guarantee to meet the UL1441 flame retardant VW-1 standard;
- ◆ Outstanding flexibility and strong tear resistance; Good resistance to mechanical damage;
- ◆ Made of environmentally friendly material, halogen-free, in line with RoHS, REACH;
- ◆ Special silicone formula material, waterproof, hydrophobic performance is excellent;
- ◆ Excellent bending and cracking resistance at high and low temperatures, suitable for special environmental scenarios;
- ◆ It has certain expansibility, suitable for special working conditions such as transition joints;

Parameter

Items	Results
Temperature tolerance	265°C±2°C, 168h ≥ 1/2 Initial withstand voltage value
Thermal aging	265°C±2°C, 168h No crack
Cold bending	-50°C, 24h No crack
Horizontal combustion	UL1441
Vertical combustion	UL1441
Hydrolytic stability	70°C, 14d No sticky, deformation or softening
Oil resistance	100°C, 96h No sticky, deformation or softening
Environmental protection	RoHS, REACH;

■ Specification and Models

Diameter mm	Tolerance (mm)	Min. wall thickness mm		Packing Specifications m/reel
		4kV	7kV	
1.0	+0.3	0.35	0.37	200
1.5	+0.3	0.35	0.37	200
2.0	+0.3	0.35	0.37	200
2.5	+0.3	0.35	0.37	200
3.0	+0.3	0.37	0.40	100
3.5	+0.3	0.37	0.40	100
4.0	+0.4	0.37	0.40	100
4.5	+0.4	0.37	0.40	100
5.0	+0.5	0.40	0.45	100
6.0	+0.5	0.40	0.45	100
7.0	+0.5	0.40	0.45	100
8.0	+0.6	0.40	0.45	100
9.0	+0.6	0.40	0.45	50
10.0	+0.6	0.45	0.50	50
12.0	+0.8	0.45	0.50	50
14.0	+0.8	0.45	0.50	50
16.0	+0.8	0.45	0.50	50
18.0	+0.8	0.45	0.50	25
20.0	+0.9	0.45	0.50	25
22.0	+1.0	0.50	0.55	25
25.0	+1.0	0.50	0.55	25

■ Application Scenarios

- ◆ New energy vehicle wire harness protection, heat-resistant insulation protection;
- ◆ Enhance the insulation and heat resistance of motor coil conductor;
- ◆ The main insulation of the flat line of the motor is easy to install and use;
- ◆ Outstanding electrical breakdown resistance of wire harnesses in the field of rail transit;
- ◆ Electrical appliances with wire harness heat insulation, insulation, anti-leakage breakdown;



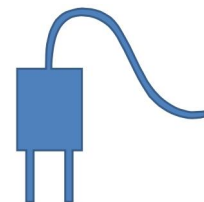
New energy Automobile



Motor



Rail Traffic



Home Appliances

Production Equipments



Mechanical Lapped and Wrapped Insulated Busbar Production Equip.



Vacuum Impregnated Insulated Busbar Production Equip.



Extruded Insulated Busbar Production Equip.



Automatic Welding Equip.



Automatic Production Equip. for Wind-power Busbar



Automatic Tube-bending Equip.

Testing Equipments



Salt-spray Test Equip.



Constant-temperature Test Equip.



High-volt. Test Equip.



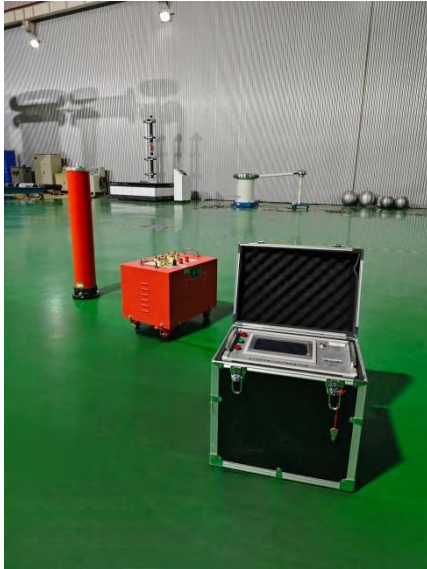
Vibration Test Equip.



Ultrasonic Flaw Detector



Withstand-volt. Test Equip.



Portable AC Withstand-volt. Equip.



Portable DC Withstand-volt. Equip.



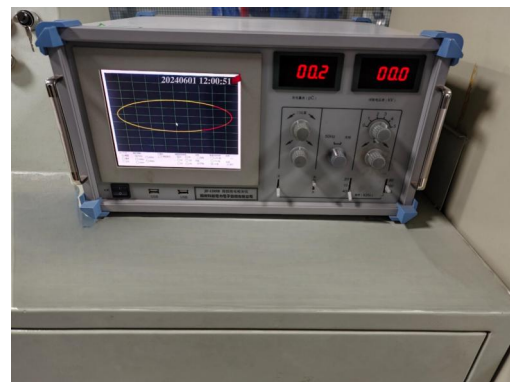
Insulation Resistance Test Equip.



Loop Resistance Test Equip.



Dielectric Loss Tester



Partial Discharge Tester

Safe, Environmentally friendly, Service-free



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